

CLAIMS

Accordingly, what is claimed is:

1. An apparatus for separating a volume of a composite fluid into at least a first and a second fluid components, the volume of composite fluid being contained in a flexible separation bag connected to at least a first and a second fluid component bags, the apparatus comprising:

a centrifuge having

- a rotor comprising

- a turntable for supporting the separation container and

- a central compartment for containing at least the first and second fluid component bags;

- a first valve member mounted on the rotor for interacting with a first tube connecting the separation bag to the first fluid component bag and selectively allowing or blocking a flow of fluid component therethrough;

• a second valve member mounted on the rotor for interacting with a second tube connecting the separation bag to the second fluid component bag and selectively allowing or blocking a flow of fluid component therethrough;

• a least one sensor for detecting a characteristic of a fluid component around a connection of a fluid component bag to the separation bag;

• a squeezing member for squeezing the separation bag and causing the transfer of the at least first and second fluid components into the at least first and second fluid component bags;

• a memory for storing at least one separation protocol and at least one centrifugation speed; and

• a control unit programmed

- for receiving from the memory information about a separation protocol to be performed and the at least one centrifugation speed;

- for causing the rotor to rotate at the at least one centrifugation speed;

- for receiving from the at least one sensor information on a characteristic of a fluid component;

- for causing, upon separation of the at least first and second fluid components in the separation bag, the first valve member to open the first tube, the second valve member to close the second tube and the squeezing member to press the separation bag so as to substantially transfer the first fluid component into the first fluid component bag;

- for causing, upon detection by the at least one sensor of a characteristic of the second fluid component on a pathway of the first fluid component to the first tube, the squeezing member to stop pressing the separation bag and the first valve member to close the first tube; and
- for subsequently causing the second valve member to open the second tube and the squeezing member to press the separation bag so as to substantially transfer the second fluid component into the second fluid component bag.

2. An apparatus according to claim 1 for separating a volume of a composite fluid into a first, a second, and a third fluid components, the third fluid component having a density comprised between a lower density of the first fluid component and a higher density of the second fluid component, the first tube opening within the separation bag in a lower density area and the second tube opening within the separation bag in a higher density area, wherein the apparatus comprises a first sensor for detecting a characteristic of a fluid component around a connection of the first fluid component bag to the separation bag and a second sensor for detecting a characteristic of a fluid component around a connection of the second fluid component bag to the separation bag, and wherein the control unit is further programmed for causing, upon detection by the second sensor of a characteristic of the third component fluid, the squeezing member to stop pressing the bag and the second valve member to close the second tube, the third fluid component remaining in the separation bag.

3. An apparatus according to claim 1, further comprising a sensor for detecting when the separation bag is substantially empty, the control unit being programmed for causing, upon detection by the second sensor that the separation bag is substantially empty, the rotor to stop rotating.

4. An apparatus according to claim 3, wherein the squeezing member comprises

- a flexible diaphragm secured to the turntable,
- a pumping station for pumping a hydraulic fluid into and out an expandable chamber delimited between the turntable and the flexible diaphragm, and
- a lid that can be secured onto the turntable so as to enclose the flexible separation bag, the flexible separation bag being squeezed against the lid when the hydraulic fluid is pumped into the expandable chamber, and wherein the sensor for detecting when the separation bag is substantially empty is a pressure sensor for sensing the pressure of the hydraulic fluid.

5. An apparatus according to claim 4, wherein the control unit is further programmed for controlling the pumping station with respect to information received from the pressure sensor so as to control a transfer flow rate of at least one fluid component from the separation bag into the fluid component bag.
6. An apparatus according to claim 4, wherein the at least one sensor for sensing a characteristic of a fluid component is mounted on an interior portion of the lid.
7. An apparatus according to claim 1, wherein the at least one sensor for sensing a characteristic of a fluid component is mounted on the turntable of the rotor.
8. An apparatus according to claim 1, wherein the at least one sensor for sensing a characteristic of a fluid component is a photocell.
9. An apparatus according to claim 1, further comprising
 - a first sealing and cutting member for permanently sealing a portion of the first tube and subsequently cutting the first tube at the sealed portion, and
 - a second sealing and cutting member for permanently sealing a portion of the second tube and subsequently cutting the second tube at the sealed portion.
10. An apparatus according to claim 9, wherein the control unit is further programmed for causing the first sealing and cutting member to seal the first tube after the first fluid component has been transferred into the first fluid component bag and for causing the second sealing and cutting member to close the second tube after the second fluid component has been transferred into the second fluid component bag.
11. An apparatus according to claim 9, wherein the first valve member and the first sealing and cutting member comprise
 - a common seat in which a portion of the first tube can be snugly engaged so as to be selectively clamped, sealed and cut, and wherein the second valve member and the second sealing and cutting member comprise

- a common seat in which a portion of the second tube can be snugly engaged so as to be selectively clamped, sealed and cut.

12. An apparatus according to claim 1, wherein each valve member is mounted on the rotor at the periphery of the central compartment of the rotor and comprises a valve head having a seat for snugly receiving a portion of tube, the valve head protruding above the turntable.

13. An apparatus according to claim 1, wherein the turntable of the rotor has a surface for supporting the separation bag that is substantially a surface of a frustum of cone.

14. An apparatus according to claim 1, wherein the turntable of the rotor has a surface for supporting the separation bag that is substantially planar.

15. An apparatus for separating a volume of a composite fluid into a first, a second, and a third fluid components, the volume of composite fluid being contained in a flexible separation bag connected to a first and third fluid component bags, the third fluid component having a density comprised between a density of the first fluid component and a density of the second fluid component, the apparatus comprising:

- a centrifuge having
 - a rotor comprising
 - a turntable for supporting the separation container and
 - a central compartment for containing at least the first and third fluid component bags;
 - a first fluid component valve member mounted on the rotor for interacting with a first tube connecting the separation bag to the first fluid component bag and selectively allowing or blocking a flow of fluid component therethrough;
 - a third fluid component valve member mounted on the rotor for interacting with a third tube connecting the separation bag to the third fluid component bag and selectively allowing or blocking a flow of fluid component therethrough;
 - a least one sensor for detecting a characteristic of a fluid component around a connection of a fluid component bag to the separation bag;
 - a squeezing member for squeezing the separation bag and causing the transfer of the at least first and third fluid components into the first and third fluid component bags;

- a memory for storing at least one separation protocol and at least one centrifugation speed; and
- a control unit programmed
 - for receiving from the memory information about a separation protocol to be performed and the at least one centrifugation speed;
 - for causing the rotor to rotate at the at least one centrifugation speed;
 - for receiving from the at least one sensor information on a characteristic of a fluid component;
 - for causing, upon separation of the three fluid components in the separation bag, the first fluid component valve member to open the first tube, the third fluid component valve member to close the third tube, and the squeezing member to press the separation bag so as to substantially transfer the first fluid component into the first fluid component bag;
 - for causing, upon detection by the at least one sensor of a characteristic of the third component fluid on a pathway of the first fluid component to the first tube, the squeezing member to stop pressing the separation bag and the first fluid component valve member to close the first tube;
 - for subsequently causing the third component valve member to open the third tube and the squeezing member to press the separation bag so as to transfer the third fluid component into the third fluid component bag until the at least one sensor detects a characteristic of the second fluid component on a pathway of the third fluid component to the third tube, whereby the second fluid component remains in the separation bag.

16. An apparatus according to claim 15, for separating a volume of a composite fluid contained in a flexible separation bag connected to a first, a second and third fluid component bags, wherein the apparatus further comprises a second fluid component valve member mounted on the rotor for interacting with a second tube connecting the separation bag to the second fluid component bag and selectively allowing or blocking a flow of fluid component therethrough, and wherein the control unit is further programmed to cause the second fluid component valve member to close the second tube until the at least one sensor detects a characteristic of the second fluid component on a pathway of the third fluid component to the third tube, and upon detection of the second fluid component by the at least one sensor, to cause the first and third fluid component valve members to close the first and third tubes, the second fluid component valve member to open the second tube and the squeezing member to press the separation bag so as to transfer the second fluid component into the second fluid component bag.

17. Apparatus according to claim 15, wherein a first and a second centrifugation speeds are stored in the memory, the first speed being higher than the second speed, and the control unit causes the rotor to rotate at the first speed until the first liquid component has been substantially transferred into the first liquid component bag, and, upon closure of the first tube by the first valve, causes the rotor to rotate at the second speed.

18. An apparatus for separating a volume of a composite fluid into at least a first and a second fluid components, the volume of composite fluid being contained in a flexible separation bag connected to at least a first and a second fluid component bags, the apparatus comprising:

centrifuging means for spinning the separation container;

- first flow controlling means for selectively allowing or blocking a flow of fluid component through a first tube connecting the separation bag to the first fluid component bag;
- second flow controlling means for selectively allowing or blocking a flow of fluid component through a second tube connecting the separation bag to the second fluid component bag;
- sensing means for detecting a characteristic of a fluid component around a connection of a fluid component bag to the separation bag;
- squeezing means for squeezing the separation bag and causing the transfer of the at least first and second fluid components into the at least first and second fluid component bags;
- memorizing means for storing at least one separation protocol and at least one centrifugation speed; and
- control means programmed

- for receiving from the memorizing means information about a separation protocol to be performed and the at least one centrifugation speed;
- for causing the centrifuging means to spin at the at least one centrifugation speed;
- for receiving from the sensing means information on a characteristic of a fluid component;
- for causing, upon separation of the at least first and second fluid components in the separation bag, the first flow controlling means to open the first tube, the second flow controlling means to close the second tube, and the squeezing means to press the separation bag so as to substantially transfer the first fluid component into the first fluid component bag;
- for causing, upon detection by the sensing means of a characteristic of the second component fluid on a pathway of the first fluid component to the first tube, the squeezing means to stop pressing the separation bag and the first flow controlling means to close the first tube; and

- for subsequently causing the second flow controlling means to open the second tube and the squeezing means to press the separation bag so as to substantially transfer the second fluid component into the second fluid component bag.

19. An apparatus for separating a volume of a composite fluid into a first, a second, and a third fluid components, the volume of composite fluid being contained in a flexible separation bag connected to a first, second and third fluid component bags, the third fluid component having a density comprised between a density of the first fluid component and a density of the second fluid component, the apparatus comprising:

centrifuging means for spinning the separation container;

first flow controlling means for selectively allowing or blocking a flow of fluid component through a first tube connecting the separation bag to the first fluid component bag;

- second flow controlling means for selectively allowing or blocking a flow of fluid component through a second tube connecting the separation bag to the second fluid component bag;

third flow controlling means for selectively allowing or blocking a flow of fluid component through a third tube connecting the separation bag to the third fluid component bag;

sensing means for detecting a characteristic of a fluid component around a connection of a fluid component bag to the separation bag;

squeezing means for squeezing the separation bag and causing the transfer of the first, second and third fluid components into the first, second and third fluid component bags;

memorizing means for storing at least one separation protocol and at least one centrifugation speed; and

- control means programmed

- for receiving from the memory means information about a separation protocol to be performed and the at least one centrifugation speed;

- for causing the separation bag to spin at the at least one centrifugation speed;

- for receiving from the sensing means information on a characteristic of a fluid component;

- for causing, upon separation of the three fluid components in the separation bag, the first flow controlling means to open the first tube, the second flow controlling means to close the second tube, the third flow controlling means to close the third tube, and the squeezing means to press the separation bag so as to substantially transfer the first fluid component into the first fluid component bag;

- for causing, upon detection by the sensing means of a characteristic of the second component fluid on a pathway of the first fluid component to the first tube, the squeezing means to stop pressing the separation bag and the first flow controlling means to close the first tube;
- for causing, when the first tube is closed, the third flow controlling means to open the third tube and the squeezing member to press the separation bag so as to substantially transfer the third fluid component into the third fluid component bag;
- for causing, upon detection by the second sensing means of a characteristic of the second component fluid on a pathway of the third fluid component to the third tube, the squeezing member to stop pressing the separation bag and the third flow controlling means to close the third tube; and
- for subsequently causing the second flow controlling means to open the second tube and the squeezing member to press the separation bag so as to substantially transfer the second fluid component into the second fluid component bag.

20. A method for separating a volume of a composite fluid into at least a first, a second and a third fluid components, the third fluid component having a density comprised between the density of the first fluid component and the density of the second fluid component, the method comprising:

- transferring the volume of composite fluid into a separation container connected to a first and a third fluid component containers;
- spinning the separation container at a first rotation speed;
- when the at least three components are separated, transferring a major portion of the first fluid component into the first fluid component container while spinning the separation container;
- when the major portion of the first fluid component has been transferred into the first fluid component container, decreasing the rotation speed to a second rotation speed at a deceleration rate selected so as to cause a suspension of the third fluid component into the remaining portion of the first fluid component;
- when the third fluid component is suspended in the remaining portion of the first fluid component, transferring the third fluid component into the third fluid container while spinning the separation container.

21. A method according to claim 20, wherein a second component fluid container is connected to the separation container, the method further comprising transferring the second fluid component into the

second fluid container when the third fluid component has been transferred into the third fluid container.

22. A method according to claim 20, further comprising controlling a transfer flow rate of at least one fluid component from the separation bag into the fluid component bag.

23. A method according to claims 20 and 21, wherein the separation container is a flexible container and the transfer of the first, second, and third fluid components into the first, second and third fluid component container is caused by squeezing the separation container.

24. A method according to claim 20, further comprising filtering the composite fluid before transferring it into the separation container.

25. A method according to claim 20, further comprising filtering at least one of the fluid components before transferring it into a fluid component container.

26. A method according to claim 20, wherein the second fluid component container contains an additive solution and is connected to a satellite container, the method further comprising:

- when the second fluid component has been transferred into the second fluid component container, mixing the second fluid component with the additive solution and
- transferring the resulting mixture into the satellite container.

27. A method according to claim 26, further comprising filtering the mixture resulting from the mixing of the second fluid component and the additive solution before transferring it into the satellite container.

28. A method according to claim 20, further comprising filtering the third fluid component before transferring it into the third fluid component container.

29. A method for separating a volume of a composite fluid into a first, a second, and a third fluid components, the third fluid component having a density comprised between a lower density of the first fluid component and a higher density of the second fluid component, the method comprising

- transferring the volume of composite fluid into a separation container connected by a first tube to a first fluid component container and by a second tube to a second fluid component container, the first tube opening within the separation bag in a lower density area and the second tube opening within the separation bag in a higher density area;
- spinning the separation container;
- when the at least three components are separated, transferring the first fluid component into the first fluid component container while spinning the separation container;
- when the first fluid component has been transferred into the first fluid component container, transferring the second fluid component into the second fluid component container while spinning the separation container, whereby the third fluid component remains in the separation container.

30. A set of containers for the separation by centrifugation of a composite fluid into at least two fluid components, the set of containers comprising a separation container connected to at least one collection container for a fluid component, wherein the separation container comprises:

- an annular chamber having an outer and an inner circumferences;
- a distribution channel attached to the annular chamber and communicating with the annular chamber via an opening located at the inner circumference of the annular chamber, wherein at least one collection container is connected to the separation chamber via the distribution channel.

31. A set of containers according to claim 30, wherein the distribution channel is shaped so that when the separation container is spun by a centrifuge, any fluid contained in the channel leaves the distribution channel and flows into the annular chamber.

32. A set of containers according to claim 30, further comprising a supply tube for transferring a volume of composite fluid into the annular chamber, wherein the supply tube is connected to the distribution channel.

33. A set of containers according to claim 30, further comprising a collection container connected by a tube to the separation container, wherein the tube opens within the annular chamber at the vicinity of the outer circumference of the annular chamber.

34. A set of containers according to claim 30, wherein the separation container further comprises a support member connected to the inner circumference of the annular chamber and at least partially closing the space defined within the inner circumference of the annular chamber.

35. A set of containers according to claim 34, wherein the distribution channel is secured to the support member.

36. A set of containers according to claim 34, wherein the support member comprises at least two apertures for cooperating with corresponding protruding elements of a rotor of a centrifuge so as to help position and secure the separation container to the rotor.

37. A set of containers according to claim 34, further comprising a collection container connected by a tube to the separation container, wherein a portion of the tube is secured to the support member over an aperture in the support member so that the portion of the tube is pre-positioned for cooperating with a valve member of a rotor of a centrifuge.

38. A set of containers according to claim 30, wherein the annular chamber of the separation container is closed by a radial seal so as to block any circular flow of fluid within the annular chamber.

39. A set of containers according to claim 30, further comprising

- a supply tube for transferring a volume of composite fluid into the annular chamber and
- a weak seal, wherein the supply tube is directly connected to the annular chamber and the opening connecting the distribution channel to the annular chamber is reversibly sealed by the weak seal so as to prevent any flow of the composite fluid into the collection container upon filling the separation container with a volume of composite fluid.

40. A set of containers according to claim 32 further comprising a weak seal, wherein a portion of the distribution channel is reversibly sealed by the week seal so as to prevent any flow of the composite fluid into the collection container upon filling the separation container with a volume of composite fluid.

41. A set of containers according to claim 30, wherein the separation container is shaped so that the annular chamber fits a frusto-conical surface of the rotor of a centrifuge.

42. A set of containers according to claim 30, wherein the separation container is shaped so that the annular chamber fits a planar surface of the rotor of a centrifuge.

42. A device for loading into the rotor of a centrifuge a set of bags for the separation of a composite fluid into at least two fluid components, the set of bags comprising a separation bag connected by a tube to at least one collection bag for a fluid component, the separation bag having an annular separation chamber delimited by an outer and an inner circumferences and a support member connected to the inner circumference of the annular chamber and at least partially closing the space defined within the inner circumference of the annular chamber, the rotor comprising a turntable for supporting the separation bag and a central compartment for containing at least the at least one collection bag, the loading device comprising a loading container having an annular rim extending outwardly, the container being shaped so as to fit within the compartment of the rotor whereas the annular rim rests on the turntable of the rotor.

44. A device according to claim 43, wherein the rim of the loading container has an outer circumference that does not exceed the inner circumference of the separation chamber.

45. A device according to claim 43, wherein the rim of the loading container comprises at least two protruding elements for cooperating with two corresponding apertures of the support member of the separation bag so as to help position and secure the separation bag to the loading container.

46. A device according to claim 43, wherein the rim of the loading container comprises at least one aperture corresponding to at least a head of a valve member mounted on the rotor at the periphery of the central compartment of the rotor and protruding above the turntable of the rotor.

47. A device according to claim 46, wherein the valve head has a seat for receiving a portion of tube, and wherein a portion of the tube connecting the at least one collection bag to the separation bag is secured to the rim over the aperture so as to be pre-positioned with respect to a tube seat of a valve member.

48. An apparatus for separating a volume of a composite fluid into at least a first and a second fluid components, the volume of composite fluid being contained in a flexible separation bag connected to at least a first and a second fluid component bags, the apparatus comprising:

- a centrifuge having
 - a rotor comprising
 - a turntable for supporting the separation container and
 - a central compartment for containing at least the first and second fluid component bags;
- a first valve member mounted on the rotor for interacting with a first tube connecting the separation bag to the first fluid component bag and selectively allowing or blocking a flow of fluid component therethrough;
- a second valve member mounted on the rotor for interacting with a second tube connecting the separation bag to the second fluid component bag and selectively allowing or blocking a flow of fluid component therethrough;
- a least one sensor for detecting a characteristic of a fluid component around a connection of a fluid component bag to the separation bag;
- a squeezing member for squeezing the separation bag and causing the transfer of the at least first and second fluid components into the at least first and second fluid component bags; and
- a control unit programmed
 - for causing the rotor to rotate at at least one centrifugation speed;
 - for receiving from the at least one sensor information on a characteristic of a fluid component;
 - for causing, upon separation of the at least first and second fluid components in the separation bag, the first valve member to open the first tube, the second valve member to close the second tube and the squeezing member to press the separation bag so as to substantially transfer the first fluid component into the first fluid component bag;
 - for causing, upon detection by the at least one sensor of a characteristic of the second fluid component on a pathway of the first fluid component to the first tube, the squeezing member to stop pressing the separation bag and the first valve member to close the first tube; and
 - for subsequently causing the second valve member to open the second tube and the squeezing member to press the separation bag so as to substantially transfer the second fluid component into the second fluid component bag.

49. An apparatus according to claim 48, further comprising a memory for storing at least one separation protocol and at least one centrifugation speed, the control unit being programmed for receiving from the memory information about a separation protocol to be performed and the at least one centrifugation speed.

50. An apparatus for separating a volume of a composite fluid into a first, a second, and a third fluid components, the volume of composite fluid being contained in a flexible separation bag connected to a first and third fluid component bags, the third fluid component having a density comprised between a density of the first fluid component and a density of the second fluid component, the apparatus comprising:

- a centrifuge having
 - a rotor comprising
 - a turntable for supporting the separation container and
 - a central compartment for containing at least the first and third fluid component bags;
- a first fluid component valve member mounted on the rotor for interacting with a first tube connecting the separation bag to the first fluid component bag and selectively allowing or blocking a flow of fluid component therethrough;
- a third fluid component valve member mounted on the rotor for interacting with a third tube connecting the separation bag to the third fluid component bag and selectively allowing or blocking a flow of fluid component therethrough;
- a least one sensor for detecting a characteristic of a fluid component around a connection of a fluid component bag to the separation bag;
- a squeezing member for squeezing the separation bag and causing the transfer of the at least first and third fluid components into the first and third fluid component bags; and
- a control unit programmed
 - for causing the rotor to rotate at at least one centrifugation speed;
 - for receiving from the at least one sensor information on a characteristic of a fluid component;
 - for causing, upon separation of the three fluid components in the separation bag, the first fluid component valve member to open the first tube, the third fluid component valve member to close the third tube, and the squeezing member to press the separation bag so as to substantially transfer the first fluid component into the first fluid component bag;

- for causing, upon detection by the at least one sensor of a characteristic of the third component fluid on a pathway of the first fluid component to the first tube, the squeezing member to stop pressing the separation bag and the first fluid component valve member to close the first tube;
- for subsequently causing the third component valve member to open the third tube and the squeezing member to press the separation bag so as to transfer the third fluid component into the third fluid component bag until the at least one sensor detects a characteristic of the second fluid component on a pathway of the third fluid component to the third tube, whereby the second fluid component remains in the separation bag.

51. An apparatus according to claim 50, further comprising a memory for storing at least one separation protocol and at least one centrifugation speed, the control unit being programmed for receiving from the memory information about a separation protocol to be performed and the at least one centrifugation speed.

52. An apparatus for separating a volume of a composite fluid into at least a first and a second fluid components, the volume of composite fluid being contained in a flexible separation bag connected to at least a first and a second fluid component bags, the apparatus comprising:

- centrifuging means for spinning the separation container;
 - first flow controlling means for selectively allowing or blocking a flow of fluid component through a first tube connecting the separation bag to the first fluid component bag;
 - second flow controlling means for selectively allowing or blocking a flow of fluid component through a second tube connecting the separation bag to the second fluid component bag;
 - sensing means for detecting a characteristic of a fluid component around a connection of a fluid component bag to the separation bag;
 - squeezing means for squeezing the separation bag and causing the transfer of the at least first and second fluid components into the at least first and second fluid component bags; and
 - control means programmed
- for causing the centrifuging means to spin at at least one centrifugation speed;
 - for receiving from the sensing means information on a characteristic of a fluid component;
 - for causing, upon separation of the at least first and second fluid components in the separation bag, the first flow controlling means to open the first tube, the second flow controlling means to close the

second tube, and the squeezing means to press the separation bag so as to substantially transfer the first fluid component into the first fluid component bag;

- for causing, upon detection by the sensing means of a characteristic of the second component fluid on a pathway of the first fluid component to the first tube, the squeezing means to stop pressing the separation bag and the first flow controlling means to close the first tube; and
- for subsequently causing the second flow controlling means to open the second tube and the squeezing means to press the separation bag so as to substantially transfer the second fluid component into the second fluid component bag.

53. An apparatus according to claim 52, further comprising a memorizing means for storing at least one separation protocol and at least one centrifugation speed, the control means being programmed for receiving from the memorizing means information about a separation protocol to be performed and the at least one centrifugation speed.

54. An apparatus for separating a volume of a composite fluid into a first, a second, and a third fluid components, the volume of composite fluid being contained in a flexible separation bag connected to a first, second and third fluid component bags, the third fluid component having a density comprised between a density of the first fluid component and a density of the second fluid component, the apparatus comprising:

- centrifuging means for spinning the separation container;
 - first flow controlling means for selectively allowing or blocking a flow of fluid component through a first tube connecting the separation bag to the first fluid component bag;
 - second flow controlling means for selectively allowing or blocking a flow of fluid component through a second tube connecting the separation bag to the second fluid component bag;
 - third flow controlling means for selectively allowing or blocking a flow of fluid component through a third tube connecting the separation bag to the third fluid component bag;
 - sensing means for detecting a characteristic of a fluid component around a connection of a fluid component bag to the separation bag;
 - squeezing means for squeezing the separation bag and causing the transfer of the first, second and third fluid components into the first, second and third fluid component bags; and
- control means programmed
- for causing the separation bag to spin at at least one centrifugation speed;

- for receiving from the sensing means information on a characteristic of a fluid component;
- for causing, upon separation of the three fluid components in the separation bag, the first flow controlling means to open the first tube, the second flow controlling means to close the second tube, the third flow controlling means to close the third tube, and the squeezing means to press the separation bag so as to substantially transfer the first fluid component into the first fluid component bag;
- for causing, upon detection by the sensing means of a characteristic of the second component fluid on a pathway of the first fluid component to the first tube, the squeezing means to stop pressing the separation bag and the first flow controlling means to close the first tube;
- for causing, when the first tube is closed, the third flow controlling means to open the third tube and the squeezing member to press the separation bag so as to substantially transfer the third fluid component into the third fluid component bag;
- for causing, upon detection by the second sensing means of a characteristic of the second component fluid on a pathway of the third fluid component to the third tube, the squeezing member to stop pressing the separation bag and the third flow controlling means to close the third tube; and
- for subsequently causing the second flow controlling means to open the second tube and the squeezing member to press the separation bag so as to substantially transfer the second fluid component into the second fluid component bag.

55. An apparatus according to claim 54, further comprising a memorizing means for storing at least one separation protocol and at least one centrifugation speed, the control means being programmed for receiving from the memorizing means information about a separation protocol to be performed and the at least one centrifugation speed.